

**Report
on
A Pilot Water Education Project for Apia
Loimata o Apaula Catchment**

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Acronyms

LOA – Letter of Agreement

MAFFM – Ministry of Agriculture, Forestry, Fisheries and Meteorology

MNRE – Ministry of Natural Resources and Environment

SPREP- South Pacific Regional Environment Programme

SWA – Samoa Water Authority

UNEP – United Nations Environment Programme UNEP's

1 INTRODUCTION

This report records and presents an account of the Pilot Water Education Project for Samoa executed from the October 2003 to January 2004. Freshwater is not only a resource for human use but also provides important habitats for many native plant and animal species. Hence, water cannot be isolated but must be seen as one element in a broader ecosystem.

Water quality varies depending on many factors including the weather. But by far the greatest determinant of water quality is the action and behaviour of people. The greatest impact has come with changing land use from the original native forest cover to other land uses - most notably farmland (especially grazing) and urban development, the building of towns and cities. When the water supply is over-used, polluted or reduced, water quality is affected. When water quality is compromised, water management is needed the most (MFENZ 2003).

Samoa's response to the need to manage its water resources has slowly picked up momentum. These efforts started back in 1993 during consultations that led to the compilation of the National Environment Management Strategy (NEMS). In its submission to the Strategic Action Plan for the International Waters Programme 1997, priority for freshwater quality was a concern. Considerable investment was put into the Integrated Coastal and Watershed Management component, a World Bank funded project inducing the preparation of management plans on the anticipated risks due to natural hazards. Further response to this crucial need is reflected in the Strategy for Development for Samoa (SDS) 2002 – 2004 prioritizes water resource management as a key area focus. The SDS encourages close coordination between the Ministry of Agriculture, Fisheries, Forestry and Meteorology (MAFFM), Ministry of Natural Resource and Environment (MNRE) and the Samoa Water Authority (SWA) to ensure the sound management of water resources. Furthermore, the Human Right Protection Party (HRPP), the present governing party in its five year declarations (manifesto) states the concern of the present party to put more effort in freshwater quality improvement through conservation and protection of its sources. The need for investigation into freshwater bodies ecology was identified in the country's biodiversity strategy in the year 2000. There is a rising public demand for sources of sufficient quality freshwater to complement the current multi-million expansion of comprehensive user pay water supply service throughout the country (MNRE 2003).

Fresh water is a fundamental resource for small island nations. All of the Samoan population have access to piped water. However, there is high rate of water loss through leakage because of weak infrastructure and wastage as a result of poor conservation measures. areas. The availability and quality of water in Samoa is directly related to land-use patterns and resource utilization. Indiscriminate logging of forests has led to adverse effects on water flows which has resulted in more frequent floods and droughts during wet and dry seasons respectively (Kishore, 2002).

2 PROJECT BACKGROUND

The Pilot Water Education Project for Samoa is one of the six pilot demonstration activities approved for implementation, as part of preparations for the Decade of Education for Sustainability (ESD), funded by UNEP's Asia-Pacific Regional Office (UNEP/ROAP) through a project titled Environmental Education, Awareness and Training in the Asia-Pacific (EEATAP). The EEATAP is funded by the GAIAX Inc. of Japan.

These activities aim to be innovative, have strong experiential learning components, involve multi-stakeholders and will be easy to replicate. This activity will engage the community and other stakeholders in identifying the key contributing factors to the quality of the river and coastal wetland eco-system, and use participatory methods to identify practical ways in which to address these factors. The effective reduction and management of waste is expected to be a large component of this project. It is envisaged that this will be a demonstration activity whereby the lessons learned can be shared with key players and stakeholders in similar communities in the South Pacific. Lessons learned from these pilot projects will feed into the Action Strategy Review and to the preparatory process for the Decade of ESD. The full description of this background is attached as Annex 1.

2.1 Implementing Partner MNRE

The Ministry of Natural Resources and Environment (MNRE) of Samoa was consulted by South Pacific Regional Environment Programme (SPREP) with regard to the planning and implementation of this project. As a result, a Letter of Agreement (LOA) was signed between the (MNRE) and (SPREP) in order to facilitate the implementation of this project (Annex 2). A consultant was recruited by SPREP in order to manage the project and to oversee the implementation of the activities. The Watershed Unit within the MNRE was the key implementing partner.

2.2 State of Natural Water Resource Management in Samoa

In its Natural Water Resources Policy (MNRE 2001), Samoa identifies the following as the challenges that need to be addressed with respect to its water resources:

- Fragmented control, management and protection of water resources
- Competing and conflicting demands for water resources by users (both consumptive and non-consumptive users)
- Insufficient knowledge and understanding of water resources nationwide;
- Social and environmental impacts of development proposals particularly abstractions are usually ignored;
- Poor water quality
- Excessive demand on water supply
- Lack of community understanding and appreciation of responsible water management;
- Limited community involvement in water resource management

At the time the project was implemented, the International Waters Project is being implemented at the same time within the Ministry of Natural Resources and Environment dealing with similar issues as the present project.

2.3 Previous Watershed Education Projects

The present effort will not be a first in endeavors to raise community awareness related to the conservation and management of watersheds in Samoa. The establishment of the Watershed Management Unit is an indication of the importance of water related issues. In order to develop an Integrated Watershed Management the Government of Samoa undertook the Vaisigano Pilot Watershed Management Project (MAFF¹ 1992).

Integrated Watershed Management is an approach to managing natural resources which seeks to balance the range of uses of land, water and other natural resources in river catchments, to ensure the future preservation of the environment while maintaining sustainable production (Dept. Primary Industries Qld, 1992)

Through the Watershed Management and Conservation Education element of the Vaisigano Pilot Watershed Management Project, education and awareness on water issues started. The development objective was to contribute to the sustained use of watershed resources by improving technical skills, basic knowledge and awareness of the watershed degradation problem and by enhancing the national capacity to plan, implement, monitor and evaluate watershed management programmes (UNDP/FAO 1998).

In a review and evaluation conducted in 1996 on the Extension and Education elements of the above projects, the following conclusions were reached:

- The project has been very effective in increasing the level of public awareness in general on problems related to water catchment protection and management in Samoa, particularly the village of Maagiagi and in villages included or surrounding major water catchments targeted by the project (Loimata o Apaula Watershed included).
- The project has also been effective in increasing the level of knowledge and participation of watershed dwellers and farmers in project activities, particularly in the areas of group education such as visits of demonstration plots and attendance to workshops
- The general assessment of the public education programme and the target group workshops is highly positive and refers to the approach, the oral presentation and the oral materials used.
- There was an overall shift of agricultural activities from the upper land areas to the lower river banks, but this can not be fully attributed to the achievements referred to above. In general, this increase in awareness and knowledge of project activities and objectives *has not translated* into a reduction of agricultural activity

¹ Ministry of Agriculture, Forestries and Fisheries

in the watersheds nor an increase in adoption of conservation farming practices promoted and demonstrated by the project, at the exception of tree planting (Martel 1996).

Other water education endeavours have always been in the context of drinking water implemented by the Samoa Water Authority (SWA).

3 OBJECTIVES

The objectives of this project are:

1. To identify in close cooperation with the Ministry of Natural Resources and Environment, Samoa an appropriate *freshwater and coastal wetlands ecosystem* as a demonstration site for this project – Loimata o Apaula Catchment Area.
2. To implement an action-oriented education programme to care for the Loimata o Apaula catchment area and guide its ongoing management, and conservation.
3. To identify and liaise with relevant stakeholders of the Loimata o Apaula Catchment area, to determine perceived and actual needs relating to its management, care and conservation.
4. To work in collaboration with the stakeholders of the Loimata o Apaula Catchment Area, to develop and implement this innovative, activity-based demonstration programme aimed at identifying and implementing solutions for its management, care and conservation.
5. Document the methodologies and processes utilized and lessons learned in this project for possible replication elsewhere.

4 DEFINITIONS

The Ramsar Convention defines wetlands as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. "Wetlands" may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands" (Ramsar Convention Bureau, 1999).

For the purposes of this project, wetland will refer to the Ramsar Classification on *inland wetland* category which include *permanent rivers, streams or creeks, and waterfalls* (Ramsar Convention Bureau, 1999).

Catchment Area refers to land which is bounded by natural features such as hills or mountains, from which all runoff water flows to a low point which could be a dam, a location on a river or the mouth of a river where it enters the ocean (Kelly et al., 1992).

This report will use the terms *watershed* and *water catchment* interchangeably.

5 PROJECT SITE – LOIMATA O APAULA CATCHMENT AREA

5.1 Method of Site Selection

The selection of a potential site for the implementation of this project involved assessing three catchment areas by the Consultant, the Environment Education Officer for SPREP and three members of the Ministry of Natural Resources and Environment.

The first site proposed by MNRE is in the village of Lepa, Aleipata. The second was the Fuluasou Catchment area, and the third one, Loimata o Apaula Catchment Area (Figure 4.1). The village of Lepa, Aleipata is the site of a planned International Waters Project that will hence, offer benefits to this conservation area and its freshwater resources. The Fuluasou Catchment Area was the site of intensive programmes, including those of an educational nature when the Watershed Unit was part of the Division of Forestry before its recent merge with the Ministry of Natural Resources and Environment.



Figure 4.1: Loimata o Apaula Catchment (Source: MNRE)

5.2 Loimata o Apaula Catchment Area.

The latter site, Loimata o Apaula Catchment Area was selected based on the reasons stated below. Loimata o Apaula Catchment is a total area of 528.59 hectares, located on the North West of Upolu, lying on the western part of Vaisigano river and the Eastern Part of Fuluasou River. (MNRE, 2003)

The deteriorating state of this catchment area deems it the appropriate site in need of an action oriented programme as presented in this project. Furthermore, this site was also favoured for the following reasons:

- There are a variety of stakeholders living and operating within this catchment area whose activities at present show clear consequences on its health. The upper Loimata o Apaula River banks, are in need of rehabilitation from damages resulting from the cultivation and other activities.
- The source of the river up at Vaoala is the rubbish dumping site for passers by or for those going past its location

- The Loimata o Apaula river runs down through the middle of Apia, one of the most densely populated areas of Apia. Some parts of the river on its way down to the Apia Harbour is used by residents living on its banks as a dumping area for household refuse.
- The upper part of the Loimata o Apaula River bears a drinking water intake point providing water to the greater Apia Area hence in need of protection.

Refer to Figure 4.5 for pictures of the project area.

5.3 Selected Site.

For the purposes of containing the pilot project to a manageable size and also due to the limited funds and time for implementation, this project focused on the Upper Loimata o Apaula Catchment Area. In Figures 4.2, 4.3 and 4.4, this area spans from the Mt Vaea and Vailima points towards Avele, Letava and Vaoala.

5.4 State of Upper Loimata o Apaula Catchment Area

Looking at Figures 4.1, 4.2 and 4.4, from the angle of the source of the river (close to bottom of page), Loimata o Apaula catchment area is bound by Mount Vaea on one side and the populated villages on the other. Figure 4.4 illustrates the topography of the catchment area with the steepest area on the slopes of Mount Vaea as well as the steepest river banks at the source of the river.

Population

According to the Village Population Census 2001, the four villages in the project site, have a total population of 3023. The village of Vailima being the most populated with 1418, followed by Avele and Vaoala with 659 and 654 respectively, and Letava with 292 people (Figure 4.1).

Land Use

Figure 4.2 illustrates the different Land use of the area within the project site. This map is interpreted with caution as the only available data was recorded last in 1987, 16 years ago which may not fully reflect the nature of the changes experienced and the true level of impact of human activities on the catchment area. Of interest is the large proportion of built up area noted on the banks of the river behind the village locations. Though the map in Figure 4.2 indicates in its green areas the large presence of forest, much of this forest has been affected by the developing cultivation activities and has certainly diminished through the advancing human settlements.

In the Loimata o Apaula Management Plan 2003, the land tenure breakdown for the whole area including the project site is presented in Table 4.1. Customary land is land held in accordance with the law relating to Samoan customs and usage.

Table 4.1: Land Tenure of Loimata o Apaula Watershed

Owner	Approximate area (ha)	%
Customary Land	97.27	19
Government Land	181.20	34
Town Area	250.12	47

Source: MNRE 2003

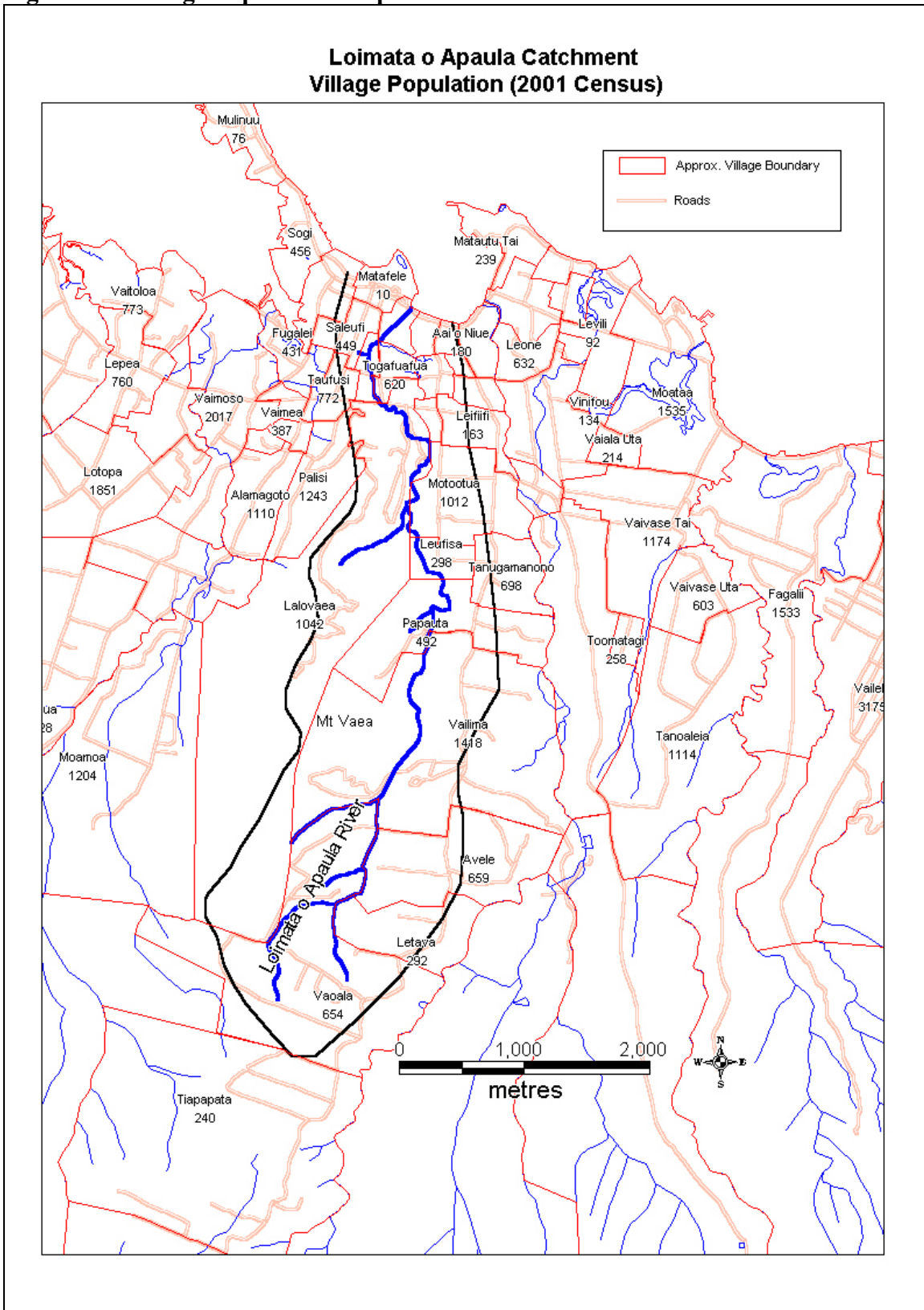
Environmental/Human Impacts

An inspection carried out by the consultant together with employees of MNRE of the project site revealed that the environmental impacts of the increasing human activities within this catchment area are obvious and to a large degree, worrying. The most obvious ones include the river drying up, soil erosion, polluted water where available, and the increase of waste dumped in certain parts of the river. A substantial number of trees have been felled by human activity and also from strong winds. All along the river banks of the marked project site have been cultivated with plantations of various crops and vegetables and other crop plants. Figure 4.5 illustrates some of these problems.

5.5 Stakeholder Identification

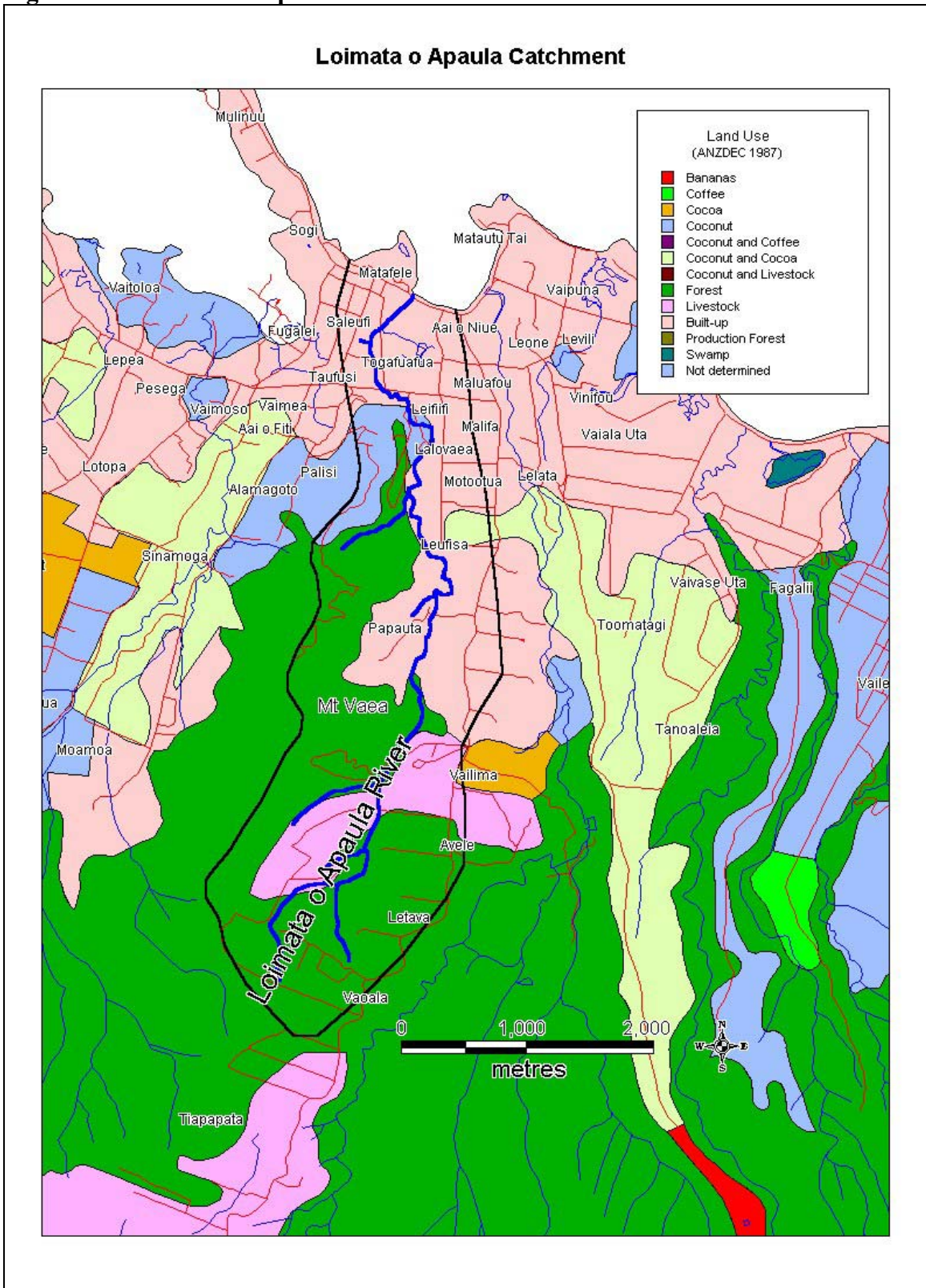
The stakeholders of the Loimata o Apaula Catchment are those who are living around and within the Loimata o Apaula Catchment area, and/or are also operating activities within or around the catchment area that may affect its health and therefore the quality of its water supply or operating programmes pertaining to its care, conservation and management. These stakeholders include families who live on the land bordering the catchment, families who own plantations and are cultivating the river banks. Other stakeholders include the Samoa Water Authority who administer the water intake point within the selected project site, the Ministry of Agriculture, Forestry, Fisheries who operate a livestock farm within the catchment area, and the Ministry of Natural Resource and Environment (MNRE) who currently is in charge of programmes to manage this water catchment area.

Figure 4.2: Village Population Map



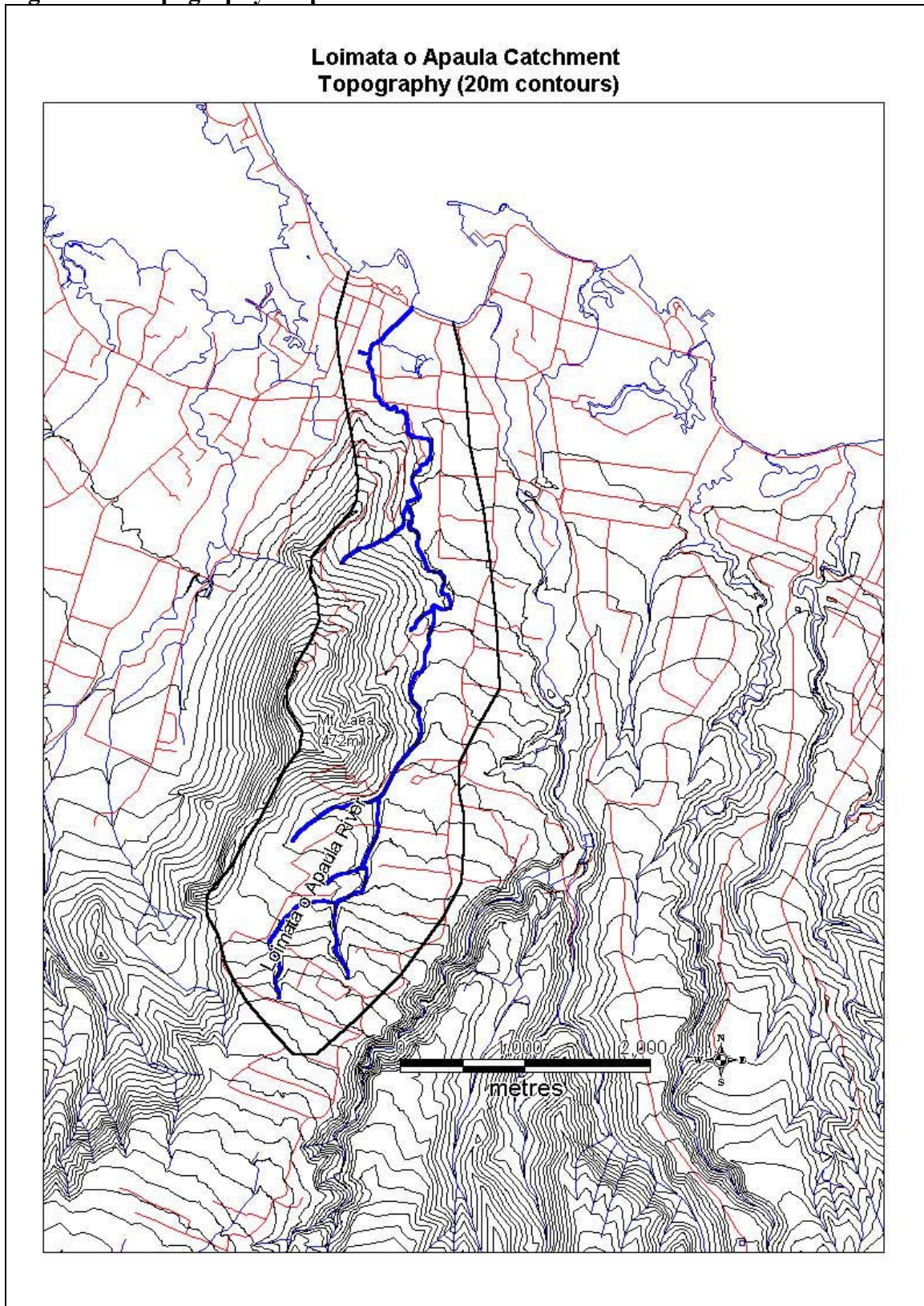
Source: James Atherton

Figure 4.2: Land Use Map



Source: James Atherton

Figure 4.3: Topography Map



Source: James Atherton

Figure 4.5 State of the Loimata o Apaula Catchment Area.



Dry River Bed



Dry river bed and erosion



Advancing Soil Erosion



Erosion and tree felling



Unprotected Water Intake point



Water intake point and dry river bed

Photos: Anona Ah Poe; Maturo Paniani

6 METHODOLOGY

SPREP employed a consultant to oversee and coordinate the implementation of this project. The Ministry of Natural Resources and Environment recommended and suggested, how the project should be carried out.

The methodology employed include participatory methods used in workshops and individual stakeholder consultations. Site inspections were carried out by the consultant watershed unit workers.

6.1 Participatory Methods

Two workshops involving the active participation of the stakeholders of the Loimata o Apaula Catchment were carried out. The first workshop brought together the community living and operating in the catchment area in order to gather information from them on their activities within the catchment area, and also to get their perceptions and views on the conservation, care and management of the Loimata o Apaula Catchment area. Annex 5 presents the results of these participatory group activities. The relevant government departments such as the Ministry of Natural Resources and Environment, the Meteorology Division of the Ministry of Agriculture, Fisheries, Forestry and Meteorology, the Samoa Water Authority were present. The information gathered from this workshop contributed towards the Loimata o Apaula Management Plan which was presented to the stakeholders in a second workshop.

6.2 Individual Stakeholder Consultations

Stakeholders as stated in an earlier part of this document are those who are living around and within the Loimata o Apaula Catchment area, and/or operating activities within or around the catchment area that may affect its health and therefore the quality of its water supply, or those operating programmes pertaining to its care, conservation and management.

Further key consultations were held with the following individuals:

- Director Ministry of Natural Resources and Environment
- Assistant Chief Executive Director Environment and Conservation
- Principal Capacity Building Officer
- Watershed Unit Manager & Assistants

An advisory committee was proposed for this catchment area in the management plan. However, as one advisory committee for water issues already exists for the International Waters Programme, the director advised it better to use this one. A meeting with this advisory committee will be held in the near future, providing the opportunity to consult with other stakeholder departments, such as the Samoa Water Authority, the Ministry of Agriculture, Forestry, Fisheries and Meteorology, the Siosiomaga society and others.

6.3 Action Oriented Programme

From the Loimata o Apaula Management Plan, written as a result of the two participatory workshops, four major areas were highlighted to form the basis of the activities of the project. These areas are:

- Education/Information
- Waste Management,
- Rehabilitation Activities
- Catchment Management Related Issues

Education/Information

Education and Awareness programmes and campaigns are important, to bring information to the people in order to continue the process of changing attitudes and behaviour. Upon assessment of existing watershed information material, it was found that the watershed unit possessed only scattered information products from past projects. These include pamphlets, posters, booklets which were no longer being used. As a response to this need, the production of information and educational products for the purpose Awareness and Education Campaigns to be launched on a day yet to be decided by the Capacity Building Unit of MNRE in the beginning of the new year. These information products include:

- Television Spots for the conservation of catchment area and about soil erosion.
- Radio Spots on the same issues
- Video about Freshwater Conservation in Samoa
- Educational Signboards for the Water Catchment Areas
- Monthly Newsletter for the community in the Loimata o Apaula Water catchment Area
- Pamphlets for the Conservation of Water Catchment Areas.
- Pamphlets about understanding soil erosion.

In addition, there is a need for a Framework of Freshwater Education to guide the activities of the MNRE in this area. This framework appears in a later part of this document.

Waste Management

Waste is one of the major problems identified in this catchment area in need of immediate action to manage it. A clean up is planned for the areas needing it and other remedial action such as the provision of rubbish bins and putting up anti-littering signboards are under way.

Rehabilitation Activities.

As noted in the foregoing section on the State of the Catchment area, activities such as tree felling and advancing cultivation to all areas of the river banks have caused a great deal of soil erosion. Hence the following rehabilitative activities have been carried out in order to curb these problems.

- Re-vegetation of River banks
- Nursery Resources
- Re-vegetation of river banks.
- Soil erosion control.

6.3.1 Management and Monitoring

It is important to have a body that is responsible for the implementation of the proposed activities and for the on going management and monitoring of the health of the water catchment area. Hence the existing Advisory Committee for the International Water Programme within the Ministry of Natural Resources and Environment will step in to continue this function.

Furthermore, other tools are required to manage the catchment area. These include the development of information such as indicators in order to have benchmarks to measure the health of water catchment areas along with other freshwater ecosystems. These indicators are proposed at a latter part of this document.

Site visits

Visitations to the selected project site and also to another catchment area was conducted to determine where to place information boards, anti-littering boards and rubbish bins. Site visits to Fuluasou Catchment area was to gather information and assess filming site for the the Television spots and education video.

The project timeline and budget appear as Annex 3 and Annex 4

7 RESULTS

7.1 Implementation of Activities

The implementation of all the activities under the four main areas has begun and will continue beyond the period of appointment of the consultant (8 December 2003) and also perhaps beyond the period of the Letter of Agreement signed between the MNRE and SPREP (30 January 2003) in accordance with the 2004 plan of MNRE activities. Table 8.1 lists the Progress of the respective activities at the time the report was written.

Table 8.1 Progress of Activities

Types of Activities	Progress	Remarks
Educational Materials		
Workshops	2 Completed	1 workshop to gather views and perceptions of stakeholders and 1 workshop to present management plan and to assure their participation in its implementation.
Video Production	Script research and writing started	Production planned and ready to be implemented.
TV Spots	1 on Water Catchment conservation 1 Anti-Littering TV Spot	Filming underway
Watershed Pamphlet	Draft ready	500 copies to be printed.
Soil Erosion Pamphlet	Draft Ready	500 copies to be printed
Monthly Community Newsletter	Draft October Issue prepared and ready	50 copies to be printed by Watershed Section and distributed to community.
Anti-Littering/Educational Signboards	Locations Identified 1 x at source of river Vaoala 1x at water intake 1x end of SPREP road 1x entry to walk up to Robert Louis Stevenson Grave	Script being researched and written Production in progress
Framework for Freshwater Education	Proposed	Framework in Recommendations part of this report.
Education and Awareness Campaign	To be launched on either Wetlands Day or Water Day	Preparation of Information Products to be finished and

	or Biodiversity Day in 2004	ready by this day.
Waste Management		
Clean Up Activity	Area for Clean Up already assessed	Clean up Activities to be carried out at the launch of the Education and Awareness Campaigns.
Rubbish Bins	Locations identified	MNRE will place these rubbish bins.
Anti-Littering Signboards	Preparations starting for their production.	Quotes for making them have been sought.
Rehabilitation Activities.		
<ul style="list-style-type: none"> • Re-vegetation of River banks 	Started already and is progressing	Tree planting has started as the beginning of effort to reestablish the canopy cover of the catchment area to stabilize the soil and prevent erosion.
<ul style="list-style-type: none"> • Nursery Resources 	Purchased	Nursing new plants underway for revegetation of required areas.
<ul style="list-style-type: none"> • Soil erosion control 	Started	
Management and Monitoring		
Loimata o Apaula Management Plan	Final Plan ready	Presented to community and stakeholders. Being Implemented
Advisory Committee	Director suggests to use advisory committee of the existing International Waters Programme	Original Advisory Committee proposed in the management plan will not be used.
Freshwater Ecosystem Indicators	Development will be proposed to MNRE	Indicators are useful to monitor the health of Freshwater Ecosystems

The implementation of the action oriented activities for the conservation, care and management of the Loimata o Apaula Catchment area when completed will indeed contribute towards reversing its deteriorating state. This pilot project sought execution at a time when Samoa's efforts are only slowly being coordinated towards a united management strategy for water resources. Determining activities for the action programme for the management, care and conservation of this catchment area was relatively easy. However, putting it into action was not so easy in the absence of an enforced legal framework and scattered institutional support.

8 CONCLUSION

The impending influence of institutional factors may be attributed to two issues. First the recent shift in June 2003 of the Watershed Management Unit from the Division of Forestry of the Ministry of Agriculture, Forestry, Fisheries and Meteorology (MAFFM) to the Ministry of Natural Resource and Environment (MNRE), and secondly, the fact that Samoa has only begun to consolidate a coordinated and harmonized effort to manage its water resources. Naturally, when the Watershed Management Unit was operating under the MAFFM, it had its set programmes which it has continued up to this day. These programmes bear a strong agroforestry orientation.

Because of the recent move of the Watershed Management Unit, it had not at the time of the implementation of this project, fully established its channel of communication, nor identified synergies with other MNRE projects and relevant sections, useful to the implementation of its activities to save time and resources. The preparation of some information and educational materials for this project could not be implemented as had been planned, because it was already planned for, in other projects. The shortage of human resources within the Watershed Unit proved another hiccup. The allocation of one person to be the focal point and partner in implementation was difficult as when this individual was away on leave, the execution of activities was just came to a stop.

A National Policy for the Management of Water Resources was coordinated and written in 2001. One of the main findings it states, crucial to the sustainable management of water resources is the fragmented control over its care and management. The MNRE is currently engaged in other programmes related to water issues such as the International Waters Programme. Through personal communications MNRE, efforts are being made towards establishing a unit to manage the water resources of Samoa.

The presence of an established legal framework and its enforcement is also a crucial part of catchment area management work. One of the actions identified by the Loimata o Apaula Management Plan is the review of Watershed Regulation. This is a welcomed activity at the moment with the presence of trespassers who have established themselves in areas they should have been prevented from, in the first place.

Though education work has been carried out in the nearby Vaisigano Watershed Pilot Project, some years ago, findings from its evaluation and review holds important lessons for the Loimata o Apaula Catchment area. The main finding of concern is that, though education initiatives within the selected area increased knowledge of the target population, it did not necessarily translate to action.

9 RECOMMENDATIONS

The Loimata o Apaula Management Plan contains activities mostly aimed at rehabilitating the area in order to reverse its deteriorating state. Though this is important, other measures of management will need to be put in place to ensure the ongoing management and care for the catchment area once it reaches a healthy state.

Hence it is important for Samoa to elaborate on the following:

- Indicators for freshwater management and reporting
- Develop Framework for Freshwater Education
- Integration of a Behavior Change Concept

9.1 Indicators

Indicators can be defined as:

- (1) It is a statistic, fact, measurement, statistical series (quantitative) or some form of evidence or perception (qualitative)
- (2) It has a purpose of defining objectives, assessing present and future direction with respect to goals and values, evaluating specific programmes, demonstrating progress, measuring changes in a specific condition or situation over time, determining impact of programmes and conveying messages.

For an environmental indicator to be sound, it should be, policy relevant, specific, valid, reliable, sensitive, measurable, user friendly and cost effective (Inwent 2003).

Examples

The Ministry for the Environment of New Zealand uses the Pressure-State-Response model for indicator development. Pressure Indicators are those that presents threat to the environment. State Indicators represents the environment's condition and Response indicators represent society's response to the pressures on, and the state of, the environment (MFENZ 2003)

The Ecosystem Health Monitoring Programme of South East Queensland (SEQ), Australia conducted a major scientific studies called **Design and Implementation of Baseline Monitoring (DIBM3)** task. The main aim of DIBM3 was to determine which tools or indicators were most suitable for measuring and reporting on current and future changes in the ecological condition or *health* of rivers and streams in SEQ. Five indicators have been recommended as a direct result of the rigorous testing undertaken in DIBM3; freshwater fish, aquatic invertebrates, physical and chemical, ecosystem processes and nutrients (QEPA 2003).

9.2 Framework for Freshwater Ecosystem Information

One of the areas needing development in the management of catchment areas is and education framework of areas relating into it in order to promote an broader understanding of catchment areas and water resources. Below is a proposed framework

1. Understanding Catchments
 - a. Physical Boundaries of Catchment (How large or small?)
 - b. Different Types of Environment in catchment
 - c. Physical, biological & chemical processes in catchments
 - d. Physical, biological & chemical processes connecting catchment from top to the ocean.
 - e. Understanding the Water Cycle
 - f. Healthy Catchments – What makes them healthy?
 - i. Water quality
 - ii. Water Quantity
 - iii. Biodiversity
 - iv. Other - Technical
2. Understanding Ecosystems
 - a. What is an Ecosystem (ways ecosystem interact at local, regional and global levels)
 - b. How ecosystems are dynamic and changing
 - c. Value of Ecosystems. How does interaction of ecosystems provide benefits to humans esp. provision of healthy water
 - d. What is Ecology? How can the study of ecology demonstrate importance of ecosystems to human well being at local, regional, and global levels.
 - e. Connection between ecosystem functioning and overall catchment health.
3. Human Impacts on Catchments
 - a.
 - Changed land use
 - Land management impacts (degradation) including salinity, sediment and nutrient pollution
 - Exotic (pest) plant introduction and invasion
 - Exotic (pest) animal introduction and invasion
 - b. Some big problems:
 - Threatened species
 - Salinity
 - Flows
 - Vegetation clearance
 - Algal Blooms
4. Taking Action to Manage Catchments (Biodiversity, Technicals)
 - a. Suggested Activities in community etc.

9.3 Promotion of Behaviour Change

The aforementioned findings on the ineffectiveness of previous projects to change the behaviour of people and especially translating knowledge into action have implications on the current project as well.

For Samoa, many factors, some mentioned in the body of this report are responsible for people's choosing to cultivate these areas important in catching and conserving water. For these areas in Apia, urbanization plays a large part. The government is taking action to address the issue through working together with the police in order to remove about ten people or families who are cultivating on the steep slopes of the river banks.

Though this necessary action is being taken, other behaviour changes need to be effected such as the throwing of rubbish into the rivers, cutting down trees and other activities that threaten the health of the catchment areas. Generally, a sense of caring for these ecosystems is an aim worthy of achieving through employing methods and tools to change behaviour.

Social Marketing

Social marketing could be a concept worth looking into. It was "born" as a discipline in the 1970s, when it was discovered that the same marketing principles that were being used to sell products to consumers could be used to "sell" ideas, attitudes and behaviors. Kotler and Andreasen define social marketing as "differing from other areas of marketing only with respect to the objectives of the marketer and his or her organization. Social marketing seeks to influence social behaviors not to benefit the marketer, but to benefit the target audience and the general society."

Like commercial marketing, the primary focus is on the consumer--on learning what people want and need rather than trying to persuade them to buy what we happen to be producing. Marketing talks to the consumer, not about the product. The planning process takes this consumer focus into account by addressing the elements of the "marketing mix." This refers to decisions about 1) the conception of a Product, 2) Price, 3) distribution (Place), and 4) Promotion. These are often called the "Four Ps" of marketing. Social marketing also adds a few more "P's." More information about this concept will be handed over to MNRE.

10 LESSONS LEARNT

It is important to recognize that a ‘demonstration site’ for the implementation of an action-oriented, innovative programme with strong experiential components as requested in the terms of reference of this project is not just an ecosystem solely existing as a consequence of nature. Rather, a water catchment area such as the Loimata o Apaula Catchment Area is not only just that, but also an area multiple stakeholders vie for, to suit their own purposes.

Figure 8.1 presents factors operating in the implementation of the current project. Lessons learnt can be categorized as presented in Figure 8.1 at the ecosystems, society, organization/institution, and at the project levels. Table 8.1, Lessons learnt elaborates on these lessons and give examples from the project.

Figure 8.1: Major Factors operating in project implementation

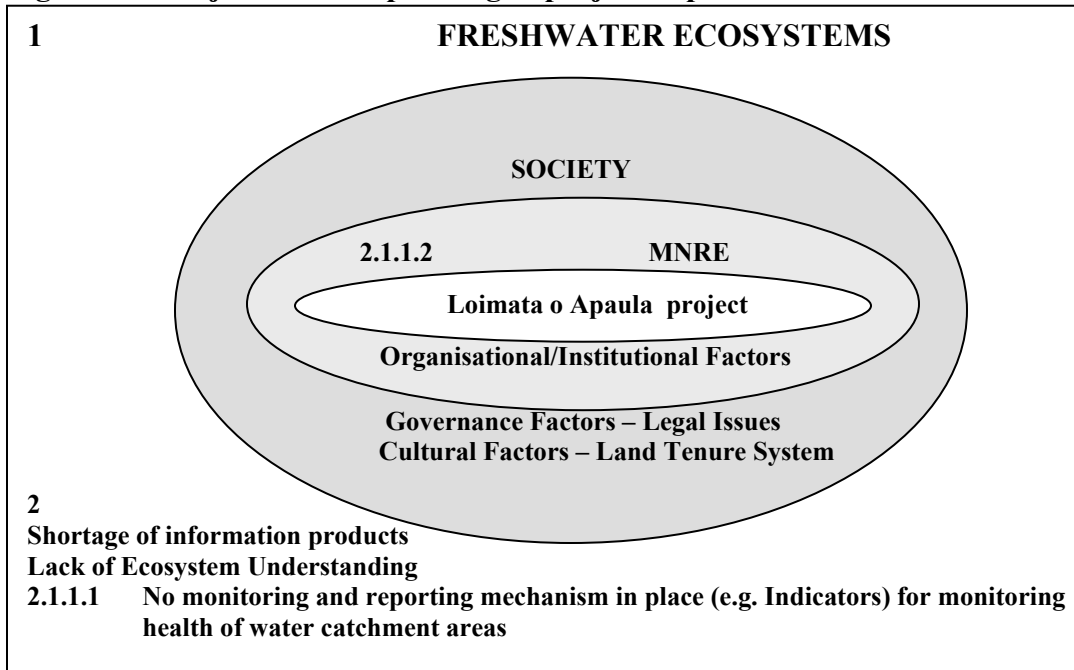


Table 8.1: Lessons Learnt

Lesson Learnt	Occurrence at Loimata o Apaula Pilot Project
Ecosystem Level	
Establish a good information base for education and awareness campaigns.	Start to put together variety of information products – posters, pamphlets, videos etc.
Need to promote broader understanding of water catchment areas in the context of ecosystems.	The educational materials existing in the current watershed unit only impart information on watersheds.
Establish monitoring and reporting mechanisms to evaluate and monitor the health of the ecosystem	No Indicators to monitor catchment areas health. No reporting system in place.
Societal Factors	
Identify societal, cultural and other broad factors operating within demonstration site (Fig 8.1).	Cultural – Land Tenure attributes 19% to ² Customary Owned land, 34% as Government Land and 47% as Town Area.
Identify if the necessary legal framework exists for the project site.	Presence of trespassers inside the project area reveal either present law is not enforced, or there are no existing regulations.
Institutional/Organisational	
At least two focal points should be sought to work together with coordinator.	One focal point partner proved difficult, as they were not always available, sometimes for up to two weeks.
Stakeholder Interest should be assessed and differentiated.	Not all stakeholders had conservation of the catchment area at heart. Those cultivating the area and also the trespassers are not necessarily interested in pro-conservation activities especially if it affects their activities.
Project	
Assess if project is integrated into the organization to avoid future repercussions	Finding out into the project that certain activities should be implemented by other members of the organization who did not know so much about the project and hence have not planned for these new activities. E.g. TV spots and Rubbish bins
Assess activities proposed if their purpose is not counter productive	Tree planting within plantations of those cultivating the river banks.

² Land held in accordance with the law relating to Samoan customs and usage; Source of statistics and definition, MNRE 2003

11 POTENTIAL FOR REPLICATION

There are many considerations to be taken into account, when a project implemented in one site is transported to another site. Assessment of factors operating at the place of implementation that will affect this project is necessary. Nevertheless, there are broad lessons learnt from this project that can be applied elsewhere. The Strength Weaknesses Opportunities Threats (SWOT) analysis is a useful tool to analyse the performance of the Pilot Water Education Project and to assist in identifying factors that will enable its potential for replication elsewhere. Table 8.2 presents this analysis.

Table 8.2 SWOT Analysis of Project

<p>STRENGTHS</p> <ul style="list-style-type: none"> - Key stakeholders(MNRE Employees), keen interest and cooperative. - Established Watershed Unit - Participatory Activities involved stakeholders (e.g. workshops) - A large number of activities already in progress - Implementation of Education and Waste Management related activities will contribute towards minimizing dumping thus improving health of catchment area. - Project will boost understanding and knowledge of stakeholders of catchment area importance. - Project enable communication amongst stakeholders. - Management Plan of the Catchment Area written and implemented. - Rehabilitative activities will ensure revegetation 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> - Non-communication within MNRE on relevant issues concerning the project. - Non-communication within the Watershed Management Unit on the project activities. - Non harmonized approach towards Freshwater Education within MNRE - Very Weak Information Base on Freshwater Education in general - Current recommended project did not take into account past lessons. - Water catchment Education lack broad overview in context of environment. - Selected Project site has broader problems affecting implementation– trespassers. - Some activities implemented are contradictory – e.g. tree planting within plantations. - Inadequate timing of some activities of project –education/awareness campaigns - No indicators for the monitoring of Water Catchment Health - Strong focus on forestry related solution to water catchment conservation
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> - Reform of Water Resources Management Sector - Harmonise freshwater related projects and activities within MNRE to avoid repetition - Develop freshwater education framework - Strengthen the legal aspect of watershed management. - Review Water Catchment Conservation Programmes in light of the broader context of the environment - Develop monitoring and reporting mechanism. - Develop indicators - Promote tools for behaviour change – Social Marketing. 	<p>THREATS</p> <ul style="list-style-type: none"> - Non-enforcement of law to keep out trespassers - Presence of Trespassers living and operating in Government Land - Inability to continue the programme until trespassers have been removed. - Inclusion of trespassers in planning of water catchment conservation. - Project only a small contribution towards changing attitudes and behaviour

From the SWOT Tables, the table of lessons learnt, Figure 8.2, a model for the replication of this project has been developed. Figure 8.3 elaborates on the different stages of the project cycle replication. After the identification of the demonstration site, it is important to assess the kind of environment within which the project will operate, if this environment is enabling or not. This is done through assessing the socio-cultural and legal factors for example. If this environment is enabling, then the project can be planned, implemented and then evaluated. Monitoring the project is an ongoing activity at all stages. After evaluation, lessons learnt, can be integrated into future projects.

Figure 8.2: Model for Project Replication

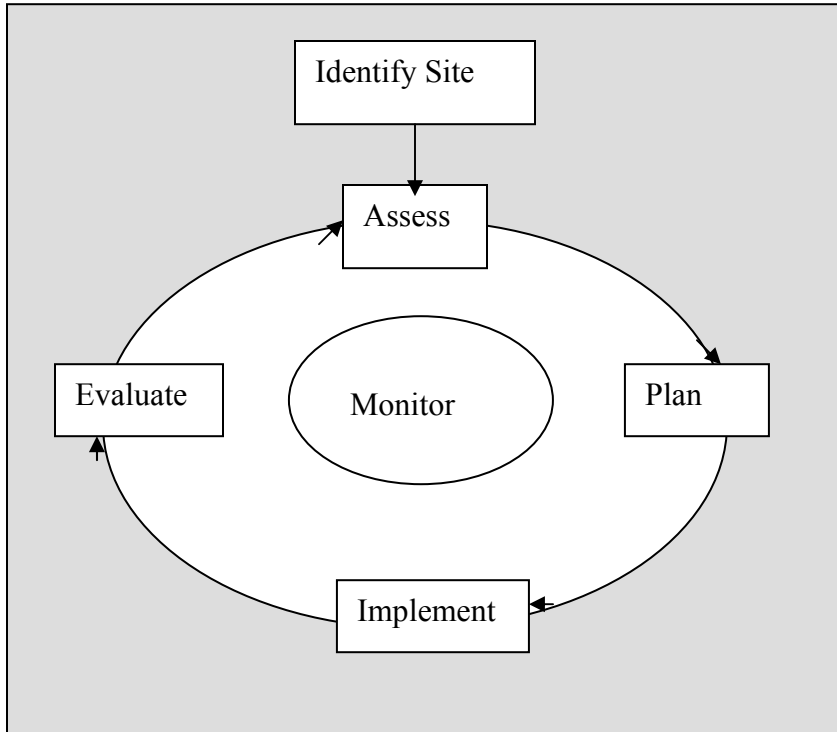
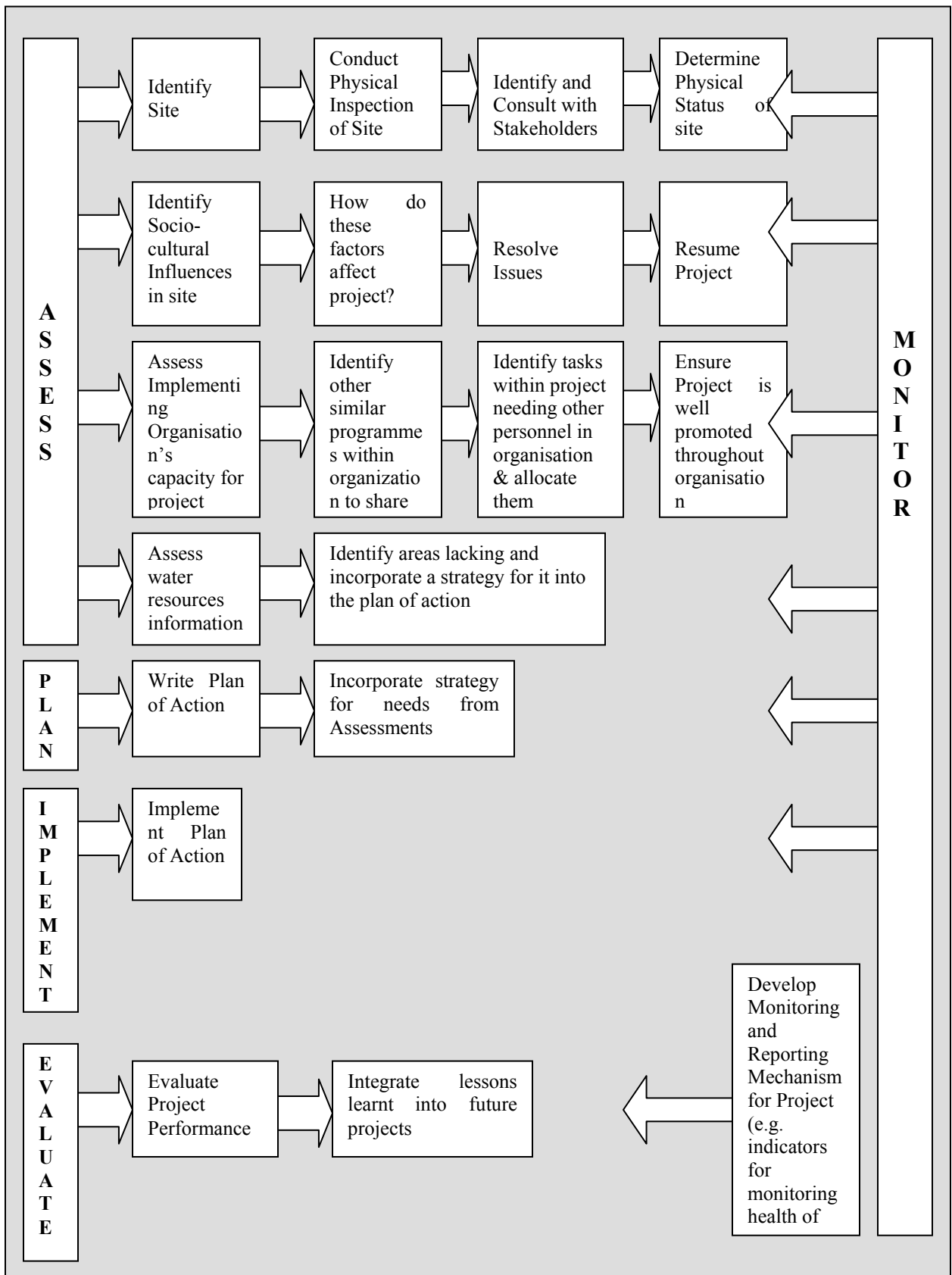


Figure 8.3: Elaboration of Model for Project Replication



References

Chand, Kishore., Samoa National Report, FAO 2002

Clark L. (ed.), Catchment Care Education Kit. Information for Teachers and Students Activities, Department of Primary Industries, Queensland. 1992

www.ramsar.org

Kelly K., Clarke L. (ed), Catchment Care Education Kit, Department of Primary Industries Queensland, 1992

Martel F., A Report on Extension & Education Programmes: Review, Evaluation and Recommendations. FAO Apia, 1996

Ministry of Agriculture, Forests, Fisheries and Meteorology, Watershed Management in Western Samoa. 1992

Ministry of Natural Resources and Environment, International Waters Programme(IWP) Samoa, Our Environment, Our Heritage, Samoa Observer March 30 2003.

Ministry of Natural Resources and Environment, Management Plan for the Loimata o Apaula Catchment, 2003

Ministry of Natural Resources and Environment, National Water Resources Policy, 2001

UNDP/FAO, Watershed Management and Conservation Education. Project Findings and Recommendations. 1998

12 ANNEX 1

As part of preparations for the Decade of Education for Sustainability (ESD), UNEP's Asia-Pacific Regional Office (UNEP/ROAP) has secured funds to develop pilot demonstration activities under a project titled Environmental Education, Awareness and Training in the Asia-Pacific (EEATAP). The EEATAP is funded by the GAIAX Inc. of Japan.

Within this project, six pilot demonstration activities have been approved for implementation. These activities aim to be innovative, have strong experiential learning components, involve multi-stakeholders and will be easy to replicate .

Lessons learned from these pilot projects will feed into the Action Strategy Review and to the preparatory process for the Decade of ESD. One of the six pilot activities is focused specifically for the South Pacific, and aims to involve a selected community in managing its coastal wetlands and freshwater river system catchment through an action-oriented education programme.

This activity will engage the community and other stakeholders in identifying the key contributing factors to the quality of the river and coastal wetland eco-system, and use participatory methods to identify practical ways in which to address these factors. The effective reduction and management of waste is expected to be a large component of this project. It is envisaged that this will be a demonstration activity whereby the lessons learned can be shared with key players and stakeholders in similar communities in the South Pacific.

This activity is based on an earlier assessment mission undertaken during August 2001, whereby immediate priorities for the Pacific region were identified through discussions with SPREP and other stakeholders.

13 ANNEX 2:LETTER OF AGREEMENT BETWEEN SPREP & MNRE

14 ANNEX 3: WORK PLAN

		Pilot FreshWater Education Project																																																			
Project Outline		October					2 0 0 3					November					2 0 0 3					December					Jan																										
		Week 1					Week 2					Week 3					Week 4					Week 5					Week 6					Week 7					Week 8					Week 9					2 0 0 4						
		M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F	S	M	T	W	Th	F	S	M	T	W	Th	F	S	M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F	W	E	E	K
Activity/Date		6	7	8	9	10	13	14	15	16	17	20	21	22	23	24	27	28	29	30	31	1	3	4	5	6	7	8	10	11	12	13	14	15	17	18	19	20	21	24	25	26	27	28	1	2	3	4	5	1	2	3	4
Project Outline																																																					
Approval of Project																																																					
Signing of LOA																																																					
Site Selection																																																					
Site Inspection																																																					
Awareness and Education:																																																					
TV Spots																																																					
- Workshops																																																					
- Management Plan																																																					
- Anti-Littering/Educational Signboards																																																					
- Monthly newsletter																																																					
-Pamphlet																																																					
-Freshwater Education Framework																																																					
-Awareness Campaign																																																					
Waste Management																																																					
- Clean up day																																																					
- Rubbish Bin																																																					
- Signboard																																																					
Rehabilitation Activities:																																																					
- Nursery																																																					
- Soil Erosion Control																																																					
- Community Tree Planting																																																					
- Replanting - Buffer Zone																																																					
Management/Monitoring:																																																					
Advisory Committee																																																					
Freshwater Indicators																																																					

15 ANNEX 4 BUDGET

Allocated Budget

Activity	Amount (SAT\$)
Education	
Educational Materials & Programmes -Workshops -TV Spots -Watershed Pamphlets - Community Newsletter	10000
Waste Management	
Waste Management Educational/Anti-Littering Signboards	3500
Rehabilitation Activities	
Re-vegetation of River Banks Nursery Resources	4000
Clean Up Day	2000
Management/Monitoring	
Advisory Committee Activities	2000
Miscellaneous Costs	733
Available Funds	SAT\$22,233 (USD\$7500)

16 ANNEX 5:RESULTS OF GROUP DISCUSSION

Group 1

Question – What ways shall we improve various programs to manage watershed resources?

- provide seedlings to the communities for tree planting
- follow up visit by the Division to confirm and monitor the effectiveness and efficiency of the program
- continue with workshop and presentation to educate the watershed dwellers
- use various media to extend the concept of watershed management

Group 2

Question – Is this workshop relevant for the management of watershed resources?

- to provide good quality and quantity of water
- minimize soil erosion
- improve soil fertility

Group 3

Question – What are the problems observed on this catchment?

- there is no communication among watershed dwellers themselves and also themselves and the Division of Environment and Conservation
- there is no fence around the water source to stop trespassing
- rubbish are dumping near the water source especially near road
- livestock farm are very close to the river system
- there is no signboard or any notice near the water source to prohibit rubbish dump at the site
- lack of awareness programs
- people from outside areas are cultivating watershed areas

Group 4

Question – What are some advices for the improvement of presented programs?

- proper guidelines so that Environment Division can be worked closely with the communities
- vegetative approach to recover watershed canopy
- signboard with notice to prohibit dumping rubbish on river bank
- discussed issues of the workshop should be strictly considered by the Environment Division for the success of the program